

CLAIMS

1. A liquid crystal apparatus with leak current preventing function, comprising:

first and second transparent substrates provided opposite to each other;

first and second transparent electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween;

a plurality of conductive particles included dispersedly within the sealing member;

a non-pixel electrode formed on position covered by the sealing member between the first and second transparent substrates; and

a dummy electrode formed oppositely to the non-pixel electrode in the position in which the first and second transparent substrates are covered by the sealing member;

wherein the dummy electrode is divided by a plurality of slits.

2. A liquid crystal apparatus with leak current preventing function as claimed in claim 1, wherein the non-pixel electrode is a lead electrode for drive.

3. A liquid crystal apparatus with a leak current preventing function as claimed in claim 1 or 2, wherein a width of each slit for dividing the dummy electrode is set to a value larger than a diameter of each of the conductive particles.

4. A liquid crystal apparatus with leak current preventing function as claimed in claim 1 or 2, wherein the dummy electrode is provided in parallel to and along a side of the sealing member.

5. A liquid crystal apparatus with leak current preventing function, comprising:

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first and second transparent substrates provided opposite to each other;

first and second transparent electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween; and

a conductive light-cutting film provided to at least one of the first and second transparent substrates for cutting off unnecessary light at the image area and peripheral portion thereof;

wherein separation slits for dividing the light-cutting film into a plurality of portions are provided on an area in which the light-cutting film is superposed with the sealing member and in the periphery of that area.

6. A liquid crystal apparatus with leak current preventing function as claimed in claim 5, wherein the width of the separation slit is three tenths ($3/10$) or less of the width of a wall of the sealing member.

7. A liquid crystal apparatus with leak current preventing function, comprising:

first and second transparent substrates provided opposite to each other;

first and second transparent electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween; and

a conductive light-cutting film provided to at least one of the first and second transparent substrates for cutting off unnecessary light at the image area and a peripheral portion thereof;

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wherein separation slits for dividing the superposed light-cutting film and the transparent electrode for image into a plurality of portions are provided on an area in which the light-cutting film is superposed by the first and second transparent electrodes for image and superposed with the sealing member and in periphery of that area.

8. A liquid crystal apparatus with leak current preventing function as claimed in claim 7, wherein the width of the separation slit is three tenths (3/10) or less of the width of a wall of the sealing member.

9. A liquid crystal apparatus with leak current preventing function as claimed in claim 7, wherein, a separation slit is provided to the light-cutting film for further dividing a part of the light-cutting film separated along the first and second transparent electrodes.

10. A liquid crystal apparatus with leak current preventing function, comprising:

first and second transparent substrates provided opposite to each other;

first and second transparent electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween; and

a conductive light-cutting film provided to at least one of the first and second transparent substrates for cutting off unnecessary light at the image area having a plurality of transparent electrodes and peripheral portion of the image area;

wherein the light-cutting film and a plurality of transparent electrodes are formed by superposing them through the insulating film, the light-cutting film has the separation slit for dividing the

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light-cutting film into a plurality of portions at the slightly inner position from the portion which is superposed with at least sealing member, further the separation slit is provided to the light-cutting film for further dividing a part of the separated light-cutting film.

11. A liquid crystal apparatus with leak current preventing function as claimed in claim 10, wherein the width of the separation slit is three tenths (3/10) or less of the width of a wall of the sealing member.

12. A liquid crystal apparatus with leak current preventing function, comprising:

first and second transparent substrates provided opposite to each other;

first and second drive electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween;

a plurality of conductive particles included dispersedly within the sealing member;

a non-pixel electrode formed at the position covered by the sealing member of the first and second drive electrodes for image;

a dummy electrode formed similar to at least a part of the non-pixel electrode, at the position in which the first and second transparent substrates are covered by the sealing member; and

a conductive light-cutting film provided to at least one of the first and second transparent substrates for cutting off unnecessary light at the image area having a plurality of transparent electrodes and peripheral portion of the image area;

wherein the dummy electrode is divided by a plurality of slits, and further, a separation slit for

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5 13. A liquid crystal apparatus with leak current preventing function as claimed in claim 10, wherein the width of the separation slit is three tenths ($3/10$) or less of the width of a wall of the sealing member.

first and second transparent substrates
provided opposite to each other;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween;

a non-pixel electrode formed at the position covered by the sealing member of the first and second drive electrodes for image;

30 to at least one of the first and second transparent substrates for cutting off unnecessary light at the image area having a plurality of transparent electrodes and peripheral portion of the image area;

35 wherein the dummy electrode is divided by a plurality of slits, and further, the light-cutting film and the first and second drive electrodes for image are superposed, and a separation slit is provided for

dividing the laminated light-cutting film and the drive electrode for image into a plurality of portions.

15. A liquid crystal apparatus with leak current preventing function as claimed in claim 14, wherein the width of the separation slit is three tenths (3/10) or less of the width of a wall of the sealing member.

16. A liquid crystal apparatus with leak current preventing function, comprising:

first and second transparent substrates provided opposite to each other;

first and second drive electrodes for image, each formed on an opposite inner surface of the first and second transparent substrates;

a sealing member provided between the first and second transparent substrates for providing a liquid crystal injecting area and forming a gap in order to seal the liquid crystal therebetween;

a plurality of conductive particles included dispersedly within the sealing member;

a non-pixel electrode formed at the position covered by the sealing member of the first and second drive electrodes for image;

a dummy electrode formed opposite to the non-pixel electrode, at the position in which the first and second transparent substrates are covered by the sealing member; and

a conductive light-cutting film provided to at least one of the first and second transparent substrates for cutting off unnecessary light at the plurality of drive electrodes for image, and the image area and peripheral portion of the image area;

wherein the dummy electrode is divided by a plurality of slits, and further, the light-cutting film and the plurality of drive electrodes for image are formed by superposing through the insulating film, the plurality of drive electrodes for image are insulated from each other, the light-cutting film has a separation

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slit for dividing the light-cutting film into a plurality of portions at the little inner position from at least the portion which is superposed with the sealing member, and further, a separation slit is provided to the light-cutting film for dividing a part of the separated light-cutting film.

17. A liquid crystal apparatus with leak current preventing function as claimed in claim 16, wherein the width of the separation slit is three tenth (3/10) or less of the width of a wall of the sealing member.

18. A liquid crystal apparatus with leak current preventing function as claimed in claim 12, 14 or 16, wherein a width of each slit for dividing the dummy electrode is set to a value larger than a diameter of each of the conductive particles.

19. A liquid crystal apparatus with leak current preventing function as claimed in claim 12, 14 or 16, wherein the dummy electrode is provided in parallel to and along a side of the sealing member.

20. A liquid crystal apparatus in which a dummy electrode arranged opposite to a drive electrode for image, is divided by a plurality of slits in order to cut off leak current flowing in the dummy electrode.

21. A liquid crystal apparatus with leak current preventing function including a separation slit for dividing a conductive light-cutting film, which is provided to at least one of inner surface of a first and second transparent substrates, into a plurality of portions.

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